

## **BOARD MOUNTING TO SUPPORT SYSTEM**

### **FIELD OF THE INVENTION**

5 The present invention relates to a board mounting system and in particular a system in which one or more resin boards are mounted to a support for the boards.

### **BACKGROUND OF THE INVENTION**

10 In the past, a conventional board has had a wooden construction. Wooden boards are mounted to support stringers or the like by nails or screws passing through the boards into the support.

15 In order to make a conventional set of wooden stairs, a wooden riser assembly is first constructed and then the horizontal tread boards are nailed or screwed to the riser construction.

20 With the prior art construction as described above even if the stair assembly is small for portability purposes it is still relatively heavy and awkward to move around. Furthermore, the wood used in the stair assembly is subject to deterioration. If one or more of the components of the assembly does deteriorate this  
25 generally necessitates a replacement of the entire assembly. The reason for this is that the screws or nails used to put the assembly together are relatively permanent making it awkward to remove the damaged component. If the damaged component is for example a  
30 stair tread and the screw or nail used to hold the tread to the riser is removed the riser may not stand up to a further screw or nail getting embedded in its surface to receive a new tread. If the old screw or nail hole is used to refit the tread it may not have sufficient  
35 positive hold to keep the assembly together. On the other hand, if a new hole penetrates the riser assembly

it may cause a cracking of the wood material which has already been weakened by the existing hole.

**SUMMARY OF THE PRESENT INVENTION**

5           The present invention provides a board mounting system in which at least one board is secured to a board support by novel means according to the present invention. That novel means is in the form of board end caps which not only provide decorative finishing for the  
10 opposite ends of the board but which also provide a securing element which cooperates between the board and the support for securing the entire assembly together.

          Through the provision of the end caps described  
15 above, the present invention is designed to take advantage of the most up to date materials now available in the marketplace for forming a board mounting system. According to a preferred embodiment of the invention the board itself has a generally hollow resin construction  
20 made in an extrusion process. The board is cut from a longer length of a resin extrusion leaving the board with substantially open unfinished ends.

          The end caps, which also preferably have a resin  
25 construction, provide the board ends with a finished appearance and further include securing means, which cooperates, with securing means on the actual support. The end caps after fitting with the opposite ends of the board then secure to the board support for locking the  
30 entire assembly together.

          As will be appreciated, a board mounting system when made in accordance with the preferred embodiment as described immediately above is relatively light in  
35 weight, is extremely weather proof and can be readily assembled, disassembled and then reassembled should

repair or maintenance to the system be required.

**BRIEF DESCRIPTION OF THE DRAWINGS**

5 The above as well as other advantages and features  
of the present invention will be described in greater  
detail according to the preferred embodiments of the  
present invention in which;

10 Figure 1 is perspective view looking down on a  
board mounting system used for forming portable steps in  
accordance with a preferred embodiment of the present  
invention;

15 Figure 2 is a rear perspective view of the  
portable steps shown in Figure 1;

Figure 3 is an exploded perspective view of the  
components of the assembly of Figures 1 and 2;

20 Figure 4 is an enlarged perspective view of one of  
the board end caps from the assembly of Figures 1 through  
3;

25 Figure 5 is an enlarged sectional view showing the  
mounting of the end cap of Figure 2 after being fitted to  
the board end to one of the riser supports of the  
assembly of Figures 1 and 2;

30 Figure 6 is a front view showing a partial section  
of the mounting of the lower tread to the riser of the  
assembly of Figures 1 and 2;

35 Figure 7 is a partially sectioned view of the  
mounting of a stair tread to a riser according to a  
further preferred embodiment of the present invention;

Figures 8 and 9 are enlarged perspective views showing end caps for fitting boards to stair risers according to yet further preferred embodiments of the present invention;

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Figure 10 is a perspective view of a board mounting system wherein that system comprises a tray mounted to the side surface of the support for the tray according to yet another preferred embodiment of the invention;

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Figure 11 is an enlarged perspective view showing one of the supports for the tray of Figure 10;

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Figure 12 is a sectional view through the tray of Figure 10 looking from the end of the tray; and

Figure 13 is a top view of the tray mounting system of Figure 10.

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**DETAILED DESCRIPTION ACCORDING TO THE PREFERRED EMBODIMENTS OF THE PRESENT INVENTION IN WHICH:**

Figure 1 shows in accordance with a preferred embodiment a set of portable stairs generally indicated at 1. These stairs can have many different applications only one of which is for use with a portable spa. The stairs which are strong but light in weight and also extremely weather resistant are at a height that they can be placed against the sidewall of the spa. Obviously, they can be placed at any desired location along the spa wall and provide easy in and out access to the spa.

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Turning now to the construction of stairs 1, they comprise a plurality of boards 3 with a pair of the boards being held side by side with one another by end caps 5. The assembly of the boards and the end caps

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comprise an individual stair tread. In the Figure 1 embodiment there are two stair treads shown and these stair treads are mounted to a stair riser generally indicated at 7. The stair riser comprises a first riser portion 9 at the front lower level of the stairs and a  
5 second higher riser portion 11 to the rear of the stairs.

As is well shown in the Figure 3 exploded view, there are two of the risers 7 one located to the opposite  
10 ends of the stair tread. As will be described later in greater detail the stair risers are, on their own, not stable in an upright position but when assembled with the overall set of stairs 1 they are held upright by the stair treads. The assembly is then reinforced with a back  
15 bracing generally indicated at 12. The back bracing is best seen in Figure 2 of the drawings.

Turning more specifically to Figures 3 and 4 of the drawings each of the individual boards 3 in this  
20 preferred embodiment has a resin construction. The boards are all identical. They are all formed in an extrusion process and each board is cut from a longer length of continuously extruded material. As will be seen in Figure 3 each board prior to mounting to the  
25 stairs has a substantially hollow interior construction. The boards as are known in the extrusion industry comprise a plurality of open cells with spaced apart vertical interior walls which provide load bearing support for the boards.

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As can be appreciated by the above description and by a review of Figure 3 the boards although capable of supporting the weight of a person standing on them are extremely light weight compared to for example, a  
35 conventional wooden board. Furthermore, they are much more durable and long lasting.

As is also known in the extrusion industry, the boards may be provided with a top surface embossing so that they are relatively slip resistant. This is  
5 extremely beneficial when the boards are used in the spa application as earlier noted. The particular resin material used to form each board is one which has outdoor weathering resistance with relatively little expansion and contraction under extreme weather changes. Such  
10 resins are well known to those skilled in the art.

The end caps 5 best seen in Figure 4 of the drawing are also preferably made of a resin material. They are best formed in a molding process. Unlike the  
15 boards the end caps have a solid more rigid construction. This construction is well suited to perform the various different functions achieved by the end caps. Specifically, the end caps provide a side by side trapping of adjacent boards 3. They also provide a  
20 decorative end finishing for the otherwise open end of the boards. As a further and particularly important feature they provide a mounting means for mounting the boards to the risers.

25 As shown in Figure 4 of the drawings, each of the end caps has substantially U shaped channel construction. This channel construction is formed by a sidewall generally indicated at 22. This sidewall includes a main wall portion 22a and shorter wall portions 22b extending  
30 at right angles to wall portion 22a. As seen for example, in Figures 1, 2 and 5 of the drawings wall portion 22a spans and covers the aligned open ends of adjacent boards to one end of each stair tread. The wall portions 22b wrap around the outer sidewalls of the side  
35 by side boards.

Also provided in the U shaped channel construction of end cap 5 is a top lip 21 and a bottom wall 27. The top lip 21 locates over the top surface of the two boards 3 while the bottom wall 27 is positioned over the bottom surface of the two boards for each end cap at each end of the stair tread.

The above combination of fittings provide an extremely effective covering and trapping for the side by side boards at each end of the stair tread.

As will be seen from Figure 4 of the drawings the bottom wall 27 of end cap 5 has a greater front to back depth than then top lip 21. This increased depth is needed for a number of reasons. Firstly, the bottom wall 27 provides a forming location for a pair of L shaped clip members 29. Each of these clip members includes a vertical leg portion 31 and a longer horizontal leg portion 33. Horizontal leg portion 33 is spaced from the bottom wall by a gap or recess 35.

The bottom wall 35 also provides a mounting location for mechanical fasteners 37 which thread up through the bottom wall and into the board material near the end of each of the boards as to be described later in detail.

Each of the stair risers 7 also preferably has a molded resin construction. Risers 7 in the preferred embodiment are made from the same or similar solid rigid formulation as that used in forming the end caps 5. As such, each of the risers is light in weight while being extremely sturdy.

Each of the riser sections 9 and 11 have an identical top surface indicated at 41 with respect to

riser section 11. This top surface comprises a flat top wall 43 with thinner top wall portions 43a. U shaped wall portions 45 extend down from the main top wall beneath thinner wall portions 43a. This leaves a gap 47  
5 directly below wall portions 43a.

The somewhat corrugated shaping of the overall top surface 41 as described immediately above makes it extremely rigid and durable.

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As earlier described, each of the end caps 5 is provided on its bottom wall with clip 29. The horizontal leg 33 of this clip slides beneath thinned wall portion 43a on the top surface of the riser. Wall portion 43a  
15 fits into the gap 35 of clip 29.

In mounting each of the treads to each riser section the two boards 3 are placed side by side with one another. An end cap 5 is fitted over the aligned ends of  
20 the boards at each end of the tread. While fitting the end caps over the boards clips 29 on the bottoms of the end caps are slid into the clip receptors formed by wall portions 43a and gaps 47 on the top of the riser. From here the mechanical fastening elements 37 typically in  
25 the form of self tapping screws are fitted up through the bottom wall of the screws into the end caps into the boards. The under surface mounting of the end caps ensures that the screws are hidden during normal use of the stairs.

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As will be appreciated from the description above the end caps provide a male to female interlock of the boards with the risers. The fitting of the mechanical fasteners 37 into the fixed length boards prevents the  
35 interlock between the end caps and the risers from separating i.e., prevents the end caps from pulling



laterally off of the riser.

In the event that any of the above described components in the way of a board, an end cap or a riser should need replacement then it is simply a matter of removing the mechanical fasteners. This then allows the end caps to be pulled out of position for dismantling the entire assembly.

After the stairs have been built in the manner described above the bracing element 12 is fitted to the back of the riser section 11. This prevents the taller riser legs from tilting inwardly or splaying outwardly beneath the stair tread. With this overall construction the set of stairs 1 shown in Figures 1 and 2 is extremely stable.

Figure 6 of the drawings shows a slightly modified stair assembly generally indicated at 51. This stair assembly is substantially the same as stair assembly 1. The only difference between the two stair assemblies is that the assembly of Figure 6 uses longer boards 3a. The riser 7 to each end of the assemblies are identical as are the end caps 5. However, when working with the longer boards 3a assembly 51 of Figure 6 includes an additional center riser 7. This center riser provides support against downward bending of the boards.

The center riser 7 is identical to the earlier described end risers 7. However, rather than securing to the boards by means of end caps mechanical fasteners preferably in the way of a self tapping screw are screwed directly up through the top wall 43 of each tier of the riser into the boards for each riser section.

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Figure 7 shows a riser section 61 which is only

slightly different from what has already been described. The actual riser supports 7 are identical to the earlier described risers. The boards 3 are also identical. However, the end caps 63 shown in Figure 7 are slightly  
5 different from end caps 5. More specifically, end cap 63 include bottom clips 65 which face outwardly of the end caps in contrast to the earlier described inwardly facing clips 29. The clips 65 still slide over the small  
10 diameter top wall portions 43a of risers 7. However, they slide from the inside outwardly rather than from the outside inwardly as found in the earlier embodiment. When the entire stair assembly of Figure 7 is in its final form including the bracing 12 the bracing prevents the two spaced apart risers from separating away from one  
15 another. This in turn maintains the interlock of the end caps with the risers. As such, no further mechanical securing elements such as mechanical fasteners 37 are needed to prevent riser assembly 61 from dismantling without first taking off the bracing 12.

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Figures 8 and 9 of the drawings show slightly different interconnections for end caps to risers according to further preferred features of the invention. In Figure 8 end cap 71 which fits to board 3 in the  
25 identical manner to that earlier described includes bottom opening 72. Riser 73 includes upwardly projecting posts 75. These posts fit into the under surface openings in the end cap. The interlocking of the post with the end caps prevents lateral shifting of the end  
30 caps relative to the riser. Separate mechanical fastening elements may be used to prevent vertical separation of the end caps from the riser.

In Figure 9 end cap 81 includes downwardly  
35 extending posts 83. These posts have barb shaped heads as seen in Figure 9.

Riser 85 includes top openings 87. The barb shaped posts 83 of end cap 81 press down and lock into the openings 87 in the riser.

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The Figure 9 set up again has horizontal interlock between the end caps and the riser. The barb shaping of the posts 83 further provides a vertical separation interlock of the end caps from the riser. This vertical interlock is more than sufficient to hold the assembly together if the stairs are picked up by the treads. The vertical interlock can however be separated by deliberately placing some type of a prying tool between the end cap and the top of the riser.

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In each of the assemblies described above the board mounting system is in the form of a portable set of stairs. Figures 10 through 13 show a further board mounting system generally indicated at 91. In this board mounting system which forms a portable tray boards 3 are once again held side to side with one another by end caps 5. The end caps mount the boards to a pair of board supports 93. Board supports 93 include vertical flanges 101 which secure to a support surface 95.

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In this embodiment the support surface is the sidewall of the earlier referred to portable spa.

The portable spa itself is likely to have a circular configuration. It may well include a protruding lip 96 as shown in Figure 13. In order to have the tray formed by the boards 3 adjustable to match to the curve surface of the spa the supports 93 have a specially designed top surface 95. This top surface includes thin surface regions 97 with underlying gaps 99. The horizontal legs 33 of the clips 29 on the under surface

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of end caps 5 fit over surface regions 97 into the gaps 99. However, surface regions 97 and the gaps 99 are elongated relative to the clip legs 33. As such, the clips are laterally adjustable relative to supports 93.

5 This allows the tray formed by the encapsulated boards to be shifted inwardly and outwardly relative to the sidewall lip 96. The laterally adjustable positioning of the tray enables it to be positioned such that the maximum surface area of the tray is exposed below the lip

10 without leaving a gap between the lip and the tray.

As to be appreciated from the description above numerous different types of supports for receiving the boards and end caps can be used in accordance with the

15 present invention. The key to the invention lies in the fact that the end caps which can be used with either a single board or multiple boards provide a finishing element for the one or more boards and also provide a means of connecting the board or boards to the board

20 support.

Although various preferred embodiments of the present invention have been described in detail, it will be appreciated by those skilled in the art that

25 variations may be made without departing from the spirit of the invention or the scope of the appended claims.